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ABSTRACT

In 1983, the Institute of Education in Singapore started a nine-year longitudinal project funded by the Bernard van Leer Foundation in Holland to study the cognitive and social development of pre-school children in Singapore. Each phase of the project was to last 3 years. Phase One (July 1983 through June 1986) concentrated on the collection of baseline data from which possible subsequent intervention strategies would be recommended. Phase Two (July 1986 through June 1989) focuses on center-based intervention strategies. Phase Three (July 1989 through June 1992) proposes to work on the involvement of parents in center activities. Between 1983 and 1986, four data collections were carried out on a sample of pupils aged 3.5 to 6 years from 40 local preschool centers. The chosen subjects were tested on a range of language, mathematics, cognitive and social tasks. Children attending private kindergartens were generally found to score better on most tasks, especially on the English Language Tasks. On most cognitive and mathematical tasks, the gap narrowed for the older students, although this change was not demonstrated on the English Language Tasks. The results suggest that there is a strong case for intervention in English at the pre-school level for Phase Two. (RJC)

A STUDY OF COGNITIVE DEVELOPMENT OF PRE-SCHOOL CHILDREN (3 - 6+) AND IMPLICATIONS FOR INTERVENTION IN SINGAPORE

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In 1983, the Institute of Education in Singapore started a longitudinal project to study the cognitive and social development of pre-school children in Singapore. The project is funded by the Bernard van Leer Foundation in Holland.

Each phase will last 3 years making the project a 9-year study. Phase one (July 1983 - June 1986) concentrated on the collection of baseline data from which possible subsequent intervention strategies would be recommended. Phase two (July 1986 - June 1989) focuses on centre-based intervention strategies. Phase three (July 1989 - June 1992) proposes to work on the involvement of parents in centre activities.

Between 1983 and 1986, 4 data collections were carried out on a sample of pupils, aged 3½ to 6+, from local pre-school centres. A total of 40 centres participated in the testing. Children were selected on the basis of age and sex and were placed in cohorts at 6-month intervals between 3 and 6½ years.

The chosen subjects were tested on a range of language, mathematics, cognitive and social tasks. Children attending Private Kindergartens were generally found to score better in most tasks, especially in the English Language Tasks, For most cognitive and mathematical tasks, the gap narrowed in the older age cohorts. This encouraging improvement was not evident in the English Language Tasks. As English is the principal language of instruction in all Singapore schools from 1987 onwards, it has therefore been decided there is a strong case for intervention in English at the pre-school level for Phase II.

5TH AUSTRALIAN DEVELOPMENTAL CONFERENCE

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THEME: DIRECTIONS IN DEVELOPMENTAL STUDIES

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1 IE-BvLF Project

In 1983, the Institute of Education in Singapore started a longitudinal project of three phases entitled "A Study of the Cognitive and Social Development of Pre-school Children in Singapore". The project is funded by the Bernard van Leer Foundation in the Hague, Holland.

Each phase is to last for 3 years, making the project a 9-year study. Phase One (July 1983 - June 1986) concentrated on the collection of baseline data from which profile subsequent intervention strategies would be recommended. Phase Two (July 1986 - June 1989) focuses on centre-based intervention strategies. Phase Three (July 1989 - June 1992) proposes to work on the involvement of parents in centre activities.

2 Phase One: Baseline Data Collection

Between 1983 and 1986, 4 data collections were carried out on a sample of pupils, aged 3½ to 6+, from local pre-school centres. The centre types involved in the study were MOE (Ministry of Education), PAP (People's Action Party), PA (People's Association), NTUC (National Trade Union Congress) and Private (YWCA, Churches). A total of 40 centres participated in the testing, Children were selected on the basis of age and sex and were placed in cohorts at 6-month intervals between 3 and 6½ years. The number of males and female for each cohort was approximately equal.

The chosen subjects were tested on a range of language, mathematical, cognitive and social tasks. With the exception of the language tasks, the other tasks were administered in the child's preferred language (Mandarin, Malay, Tamil and dialects). Cognitive development was assessed by performance in the language, mathematical and cognitive tasks. Since the focus of this paper is on cognitive development, the social tasks and performance in these tasks will not be discussed. Table 1 presents the language, mathematical and cognitive tasks used in Phase 1.

NOTE:
The Project Director of the IE-BvLF Project is Dr Ko Peng Sim, Head/ Department of Educational Psychology, Institute of Education, Singapore.

Table 1: Content of Language, Mathematical and Cognitive tasks

Language Tasks	Mathematical Tasks	Cognitive Tasks
° Visual Discrimination ° Auditory Discrimination ° Concept of Print ° Word Knowledge *(E) ° Verbal Fluency *(E) ° Word Knowledge * (C/N/T) ° Verbal Fluency * (C/N/T) NOTE E: English C: Chinese M: Malay T: Tamil	° Number concept ° Verbal counting ° Rational counting ° Recognition of Numerals ° Matching of Numerals 1 ° Matching of Numerals 2 ° Number relations (2 and 4 coins) ° Number relations (3 and 5 coins) ° Conservation of Number ° Conceptual Grouping ° Addition (pictorial) ° Addition (symbolic) ° Subtraction (pictorial) ° Subtraction (sympolic)	° Conservation of length ° Conservation of liquid ° Causal thinking ° Geometrical shape identification ° Geometrical shape drawing ° Age notion ° Time sequence ° Class inclusion ° Seriation ° Objection distance

Fig. 1 Strengths of Private and Non-private Children: Language, Mathematics and General Cognitive Abilities.

(Reproduced from Dr Ko Peng Sim's paper to IE-BvL Steering Committe on 26 August 1987)

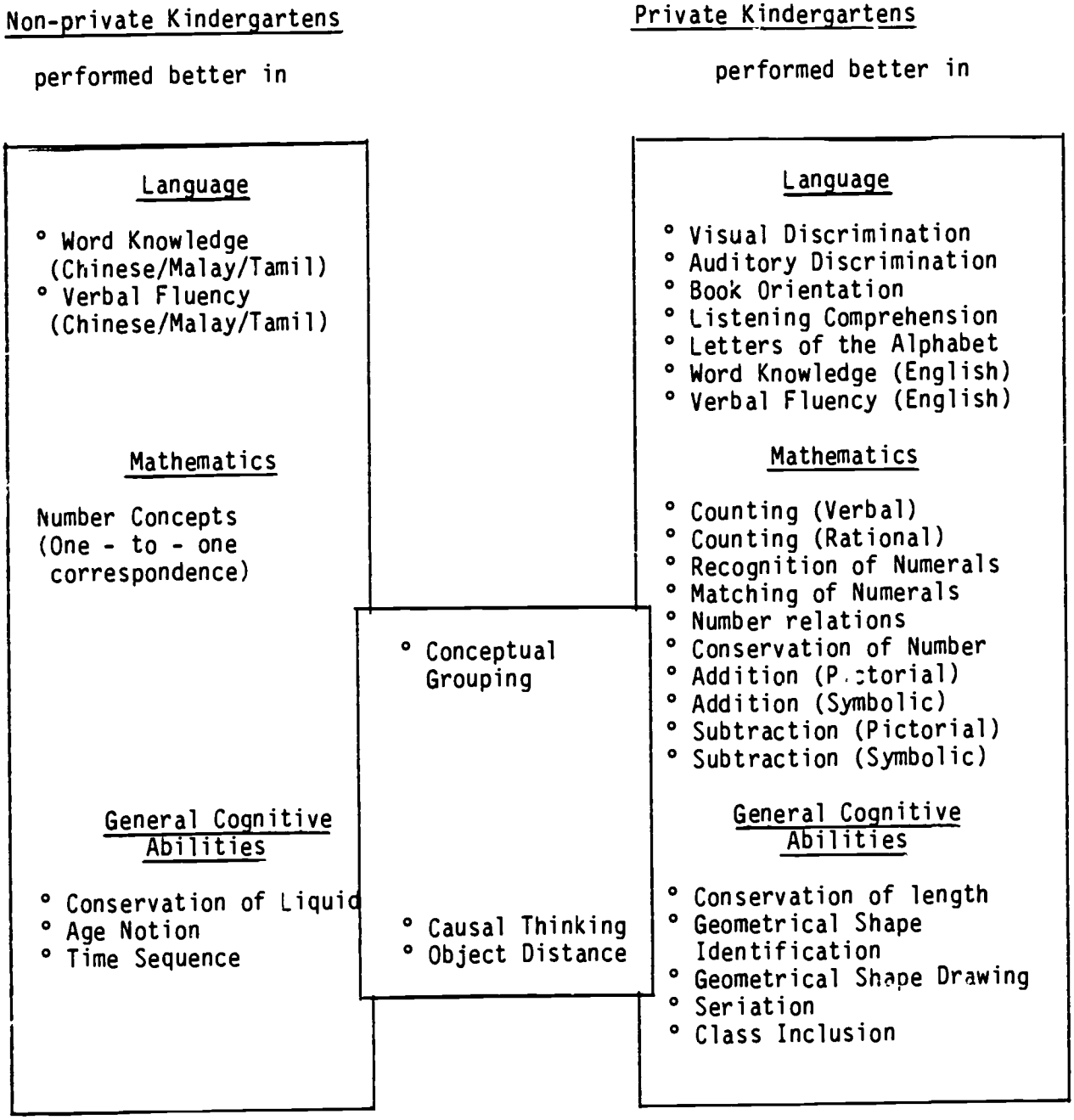

Table 2: Means of Language tasks
(Data Collection 1 to 4) for the 5 yr 6mth to 5yr 11mth Cohort

Tasks	Type	1	2	3	4
° Discrimination of word sounds Max. score = 8	Non-private Private	5.38 6.77	5.95 6.59	5.79 7.21	5.45 7.21
° Discrimination of words sentence Max. score = 10	Non-private Private	4.70 7.42	5.54 6.86	6.10 7.88	6.46 8.33
° Listening Comprehension Max. score = 6	Non-private Private	2.64 5.12	2.61 4.77	3.32 5.88	3.01 5.63
° Verbal Fluency (English) Max. score = 5	Non-private Private	2.22 3.38	2.17 3.27	2.53 4.18	2.58 4.21
° Verbal Fluency * (C/N/T)	Non-private Private	3.93 2.08	3.63 2.73	3.96 3.15	3.91 2.88

* Note

C : Chinese
M : Malay
T : Tamil

Discrepencies were noted in the performance between the Private Kindergartens and the Non-private Kindergartens (PA, PAP, NTUC and MOE). Children attending Private Kindergartens were generally found to score better on most tasks especially the English Language Tasks (Fig I). The area in which the Non-private centres really excelled in was the Second Language Tasks (Chinese/Malay/Tamil). Though pupils in the Non-Private Kindergartens did not fare too well in some of the cognitive and mathematical tasks, the gap narrowed in the older age cohorts. This encouraging improvement was not evident in the English Language Tasks, especially in Auditory Discrimination, Listening Comprehension and Verbal Fluency (Table 2).

The finding that some pre-school children have fallen short of expectations in the language area is a matter of great concern in the context of Singapore where the need to achieve bilingualism is being listed as an important objective of the national education policy. Of particular concern is the lack of English Language fluency among children attending the Non-Private Kindergartens. The problem is indeed serious when one realizes that 80% of the total pre-school population attend pre-school classes run by the Non-private Centres. Furthermore, English is the principal medium of instruction in all schools from 1987 onwards.

Two principal factors may account for the poor show in the English Language tasks by the children attending the Non-Private Centres. Most of these children spoke little English at home and their parents were from the working class speaking mainly Chinese, Malay, Tamil or dialects. The other factor was the lack of good language models in the classroom. Many of the "teachers" employed by the Non-Private Centre lacked formal teaching skills and had a limited command of spoken English.

3 Phase 2: Centre-based Intervention

Based on the observations gathered in Phase 1, the following conclusions were reached:

1) Non-private kindergartens are in need of help to upgrade the teachers in their teaching skills.

2) The focus of intervention is language. In the Singapore education system, strong emphasis is placed on language learning. According to Halliday, Language is learning. This does not imply that the need for guidance in the mathematical and cognitive areas is ignored. Activities enhancing children's abilities to solve mathematical and cognitive problems are incorporated into the language activities. The language skills emphasized in the intervention are listening comprehension and verbal fluency.

   Hence for Phase 2, intervention is centre-based. The centres involved are the Non-private centres. As the intervention period stretches over two years, the pre-primary classes are excluded from this phase. Though the private kindergartens need no intervention in language learning, one centre participates as a control centre.

   An elaborate training programme to equip teachers and supervisors from the Non-Private Centres with the necessary communication skills in language teaching was developed (Table 3). A group of 20 teachers was chosen and specially trained over a period of 1½ years. In order to help the centres to develop their own training programmes, a group of 20 supervisors attend workshops to learn the skills of organising their own in-house training session. Each supervisor is expected to train 20 teachers.

Table 3: Objectives of Intervention Workshops for Teachers and Supervisors

FOR TEACHER	FOR SUPERVISORS
1 To equip teachers with basic skills in communicating with young children.	1 To equip supervisors with skills to train their staff to work with young children effectively in the specific area of language development.
2 To help teachers to develop skills in the art of story-telling and to be able to use them effectively to generate language.	2 To introduce new ideas and ways to organise their learning environment so as to help them in the successful implementation of the new programme.
3 To provide teachers with skills in organising indoor free choice activities.	3 To help the supervisors develop a training package for their teachers.
4 To develop teaching materials and Big Books for class room teaching.	4 To equip the supervisors with motivation and supervisory skills to their work with their staff.
5 To motivate teachers to work independently by introducing them to new ideas and new ways of interacting with children	

Teachers under training are monitored by the IE-BvL project staff. In addition, pupils of these teachers are also being observed during lessons and 20 pupils from each class are put through a series of language tasks. Pupils from four control centres in the project participate in the testing sessions too. Table 4 gives an outline of the training and testing programme in Phase 2.

Table 4 SCHEDULE OF IE-BvLF TRAINING AND TESTING PROGRAMME 1987-1989

GROUPS / PERIOD	SUPERVISORS GROUP* (1)	TEACHERS GROUP* (2)	TEACHERS GROUP* (3)
1987 July to September	IE workshops on Basic Skills (15 July - 2 Sep)	IE workshops on Basic Skills (18 July - 5 Sep) (Pre-testing of children) (Pre-assessment of teachers)	(Pre-assessment of teachers)
October to November	Centre-based workshops on Implementation Plans and Training teachers	Monitoring of teachers in their centres by BvLF project stafff	Centre-based workshops on Basic Skills by supervisors (Pre -testing children by RAs)
1988 January to March	IE workshops on developing weeekly programmes and daily lesson plans	IE workshoos on lesson plans (Testing of children by RAs)	Monitoring of teachers by BvLF project staff
April to June	Centre-based workshops on programme and lesson planning	Monitoring of teachers by BvLF project staff	Centre-based workshops on lesson plans by supervisors (Testing of children by RAs)
July to September	IE workshops on observation and assessment of childrens's language skills, and parental education	IE workshops on developing new ideas and teaching materials (Testing of children by RAs)	Monitoring of teachers by BvLF project staff
October to December	Centre-based workshops on assessment of children's language skills and parental education	Monitoring of teachers by BvLF project staff	Centre-based workshops on developing new ideas and materials (Testing of children by RAs)
1989 January to March		(Testing of children by RAs)	Monitoring of teachers by BvLF project staff
April to June			Testing of Children by RAs)

*Group 1 (Supervisors) are trained by IE staff.
Group 2 (Teachers) are trained by IE staff.
Group 3 (Teachers) are trained by the supervisors from Group 1.

Task Selection in Phase 2

The language data collected during Phase 1 provided broad baseline data in the major language skills of reading, listening and speaking. Empirical evidence from Phase 1 data indicated the necessity for refining the language focus to the assessment of Listening Comprehension and spoken English. Therefore changes in the original language tasks and new tasks were found necessary. The Phase 2 assessment tasks represent the new emphasis on listening and speaking (Table 5).

Table 5 Comparison of Phase 1 and Phase 2 Language Tasks.

Phase 1 Tasks	Phase 2 Tasks
° Visual Discrimination ° Auditory Discrimination ° Concepts of Print ° Word Knowledge (English) ° Verbal Fluency (English) ° Word Knowledge (Chinese/Malay/Tamil) ° Verbal Fluency (Chinese/Malay/Tamil)	° Interview ° Commands ° Listening Comprehension ° Word Knowledge ° Record of Oral Language ° Picture Narrative ° Picture Talk

The selection and ordering of the new tasks is intended to reflect an understanding of developmental stages in language learning beginning with the receptive language skill of listening comprehension and proceeding to the productive language skill of spoken oral communication. The rationale for the revised and new tasks in Phase 2 is presented in Table 6.

Table 6. Hierarchy and Rationale of Revised and new Tasks in Phase 2.

Tasks	Rationale
° Interview	The interview provides a meaningful way to meet the child for the first time as well as a task around which language can be elicited. The language gathered in this task draws upon experiences familier to the child. Sample item: How old are you?
° Listening Commands	Based on Asher's theory of Total Physical Response, a child's understanding of speech/language precedes production. Understanding can be demonstrated through carrying out directions. The commands are sequenced according to length and number of directions. Sample items: 1. Walk to the door 2. Put the small book on top of the big book.
° Word Knowledge	This task is designed to assess the child's receptive and/or productive comprehension of common pre-school vocabulary items. It is useful to determine a child's range of vocabulary. Items have been carefully selected, based on cultural context. Fourteen groups of 6 items per group, making a total of 84 vocabulary items are found in this task. The original task had only 16 items. Sample groups and items: 1. Animals : dog, mouse, cat 2. Utensils: spoon, chopsticks, bowl 3. Shapes : circle, triangle, square

Tasks	Rationale
° Listening Comprehension	Rationale is the same as above. This task can be administered to a small group and hence allows for a more extensive range of listening comprehension items. Unlike the listening comprehension task in Phase 1, it does not involve production skills. Sample items Put a cross(x) on the picture 1. with three boys. 2. that shows the Tan family waiting for the bus. Mr and Mrs Tan, and their children are going to the market. Mr Tan is carrying two bags.
° Record of oral language (ROL)	The rationale for using this task is based on the notion that during Language Acquisition, children go through a phase of language imitation. Research on language imitation suggests that while imitation is a part of language acquisition, true language learning only occurs when children begin to make generalization about the language, thus changing from imitation to self generated structures (one word/phrases). Sample items: 1. Siew Ling is drinking some milk. 2. I played in the park, then I went home.
° Picture Narrative	It assesses a child's ability to narrate a story based on a sequence of picture stimuli (4 pictures per story). The task provides a set of question prompts for the test to guide the child's story telling if the child is unable to generate his or her own narrative. Two sets of story cards are developed. Sample: 1. Waking up 2. Gold Fish Bowl
° Picture Talk	This is a more difficult task than Picture Narrative. The child is required to select and talk about what she or he sees in a photograph. The type of language expected from this task would be descripted. This is a modification of the original task in Phase 1. Two colour and two black/white photos are provided. Sample: 1. Fruit Stall (colour) 2. Watching TV

To date, the pre-intervention assessment and the first post-intervention assessment have been conducted. The second post-intervention assessment is in progress.

4. Conclusion

The IE-BvLF Project hopes to better prepare young children who come from non-English speaking homes for their formal education in the primary school. In view of the emphasis on language proficiency in our educational system, this attempt is received with much enthusiasm by the Non Private Pre- school centres. After their training at the workshops, the teachers try out the new approach of language teaching on their pupils. Most intervention programmes speak of the vital role of parental involvement in the successful implementation of the programmes. Hence, Phase 3 of the IE-BvLF Project hopes to invite parents to be involved in the pre-school programme.

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